

Photoacoustic Spectroscopy Comprehensive Exam Topics

1. Spectroscopic fundamentals of the photoacoustic method (quantum mechanical selection rules, rovibrational transitions, normal modes of vibration)
2. Photoacoustic signal generation, the fundamental photoacoustic equation
3. System theory approach to the subprocesses of photoacoustic signal generation
4. Spectroscopic fundamentals of the photoacoustic method II (vibrational overtones and combination bands, absorption linewidth)
5. Light sources in photoacoustic systems, modulation techniques
6. Comparison of photoacoustic and optical absorption spectra (effects of amplitude and wavelength modulation)
7. Noise in photoacoustic measurements, signal-to-noise ratio
8. Analytical applications of the photoacoustic method
9. Optimization of photoacoustic systems, measurement planning
10. Algorithms for photoacoustic measurement programs
11. Applications of the photoacoustic method
12. Comparison of the photoacoustic method with competing techniques

Suggested readings:

[Photoacoustic IR spectroscopy: instrumentation, applications and data analysis/ Kirk H. Michaelian](#)

Michaelian, Kirk H.

Weinheim: Wiley-VCH-Verl., 2010

[Laser optoacoustic spectroscopy.](#)

Zsarov, Vladimir P.

Berlin - Heidelberg etc: X, 1986

(Springer Series in Optical Sciences.: 37.).

[Optoacoustic spectroscopy and detection, \[elektronikus dokumentum\]/ ed. by Yoh-Han Pao](#)

New York, N.Y.; San Francisco, Calif.; London: Academic Press, 1977

(Elsevier Backfile E-book Collection : 2013).